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SEASONAL DISTRIBUTION OF THE AZURE GALLINULE (*PORPHYRULA FLAVIROSTRIS*), WITH COMMENTS ON VAGRANCY IN RAILS AND GALLINULES

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Abstract.—Specimen records and field observations of the Azure Gallinule (*Porphyrula flavirostris*) provide evidence that this species undergoes seasonal movements in portions of its range. Although present year-round in much of Amazonia, it is seasonal in the Guianas, southwestern Amazonia, and Paraguay. Data from single localities within these areas also indicate that this species is seasonal. The existence of five extralimital records supports the hypothesis that this species is migratory. Presence may be timed to correspond with wet or high-water seasons. Unfortunately, the absence of label data on gonad size and fat deposits for the vast majority of the 143 available specimens limits their use in unravelling the seasonal cycle of this species. The preferred habitat of the Azure Gallinule in western Amazonia is extensive areas of marsh grass (*Paspalum*). An overview of rail and gallinule distribution emphasizes that many species may occur at unpredictable times and places, as might be predicted from their dependence on ephemeral marsh habitats. The two congeners of the Azure Gallinule, Purple and Allen's gallinules (*P. martinica* and *P. alleni*), provide extreme examples of species capable of long-distance, extralimital occurrences. From these points, we conclude that the recent New York (USA) specimen of Azure Gallinule is best regarded as a record of a wild bird. *Received 4 Aug. 1989, accepted 1 Nov. 1989.*

The Azure Gallinule (*Porphyrula flavirostris*) is found in the lowland tropics of South America, primarily in the Amazonia-Guianas region. Until the recent specimen record from New York (Boyle et al. 1987), this species had not been found farther north than Venezuela, Trinidad, Guyana, and Surinam. Most current references (e.g., Meyer de Schauensee 1966, Haverschmidt 1968, Blake 1977, Ripley 1977, Meyer de Schauensee and Phelps 1978, Sick 1985) indicate or assume implicitly that this species is completely sedentary. Therefore, whether the recent record from New York represented a wild bird has been controversial (Blom 1987, Boyle et al. 1987). Because our own field experience with the Azure Gallinule in Peru (Parker 1982, unpubl. data) and Colombia (JVR, unpubl. data) suggested that this species was present at certain localities only seasonally, we suspected that a thorough analysis of specimen records might reveal seasonal movements. Here we analyze the geographic and seasonal distribution of the Azure Gallinule, evaluate the New York record, and summarize the evidence that some species of rails and gallinules are champion long-distance dispersers.

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METHODS

We solicited specimen data from most museums with extensive holdings of Amazonian birds. Reliance on specimen records to determine seasonal distribution has obvious drawbacks, particularly for analysis of a marsh-dwelling species that occurs in a relatively little-known region. Absence of specimens from a region or a season might mean only that the region was not visited by a collector of marsh birds at that season or that the collector was unable to secure a specimen. Also, the number of specimens collected may not be related to a species' abundance. For example, S. L. Klages' field notes indicated that the Azure Gallinule was "plentiful" at Santarem, yet he collected only two specimens during his six months there (K. C. Parkes, in litt.).

To control in part for possible seasonal and regional biases in collecting effort, we also requested similar data from certain museums for another species of Amazonian marsh bird, the Wattled Jacana (*Jacana jacana*); our (untested) assumption was that the Wattled Jacana is sedentary. Although the Purple Gallinule (*Porphyrula martinica*) might be considered a more appropriate species for comparison because it is ecologically and taxonomically closer to the Azure Gallinule and occurs throughout its range, we did not do so because: (1) Amazonian populations of the Purple Gallinules may be comprised of individuals that are migrants from both North America and southern South America, and (2) Amazonian breeding populations might also be migratory.

We placed each specimen record in one of five regions of South America: (1) the Guianas (Guyana, Surinam, French Guiana); (2) eastern Amazonian Brazil (Pará, Amapá); (3) western Amazonia (western Brazil in Amazonas, southern Venezuela, Amazonian Colombia and Ecuador, northeastern Peru in Loreto); (4) southwestern Amazonia (southeastern Peru in Madre de Dios, eastern Bolivia, southwestern Brazil in Mato Grosso); and (5) Paraguay. Two specimens from Minas Gerais, Brazil, and three from the Andes were not placed in any of these regions.

Wattled Jacanas were collected in 54 (90%) of the 60 month-samples in our five regions (Figs. 1–5), even though only a subset of the museums surveyed for Azure Gallinules were also surveyed for Wattled Jacanas. Furthermore, Azure Gallinules were collected in all six month-samples in which no Wattled Jacanas were collected. We interpret these results to indicate that the potential biases in the distribution of collecting effort in marsh habitats were not of the magnitude that would give us a completely erroneous view of the distribution of the Azure Gallinule. Nevertheless, we urge caution in interpretation of "negative" data, i.e., gaps in the specimen record. To augment our data base, we also searched the literature for additional records of Azure Gallinules as well as reports of seasonality in its distribution, and we extracted from our field notes all our sight records of this species.

RESULTS

General status, distribution, and habitat.—Reference works (Peters 1934, Meyer de Schauensee 1966, Haverschmidt 1968, Blake 1977, Ripley 1977, Meyer de Schauensee and Phelps 1978, Sick 1985) give conflicting information concerning the range of the Azure Gallinule; some describe the range as spotty, whereas others imply that it has a continuous distribution in Amazonia and its periphery. Only in Surinam has it been considered common (Haverschmidt 1968); we found only 1–4 specimen records each from countries in western Amazonia, i.e., Venezuela, Colombia, Ecuador, Peru, and Bolivia (Table 1).

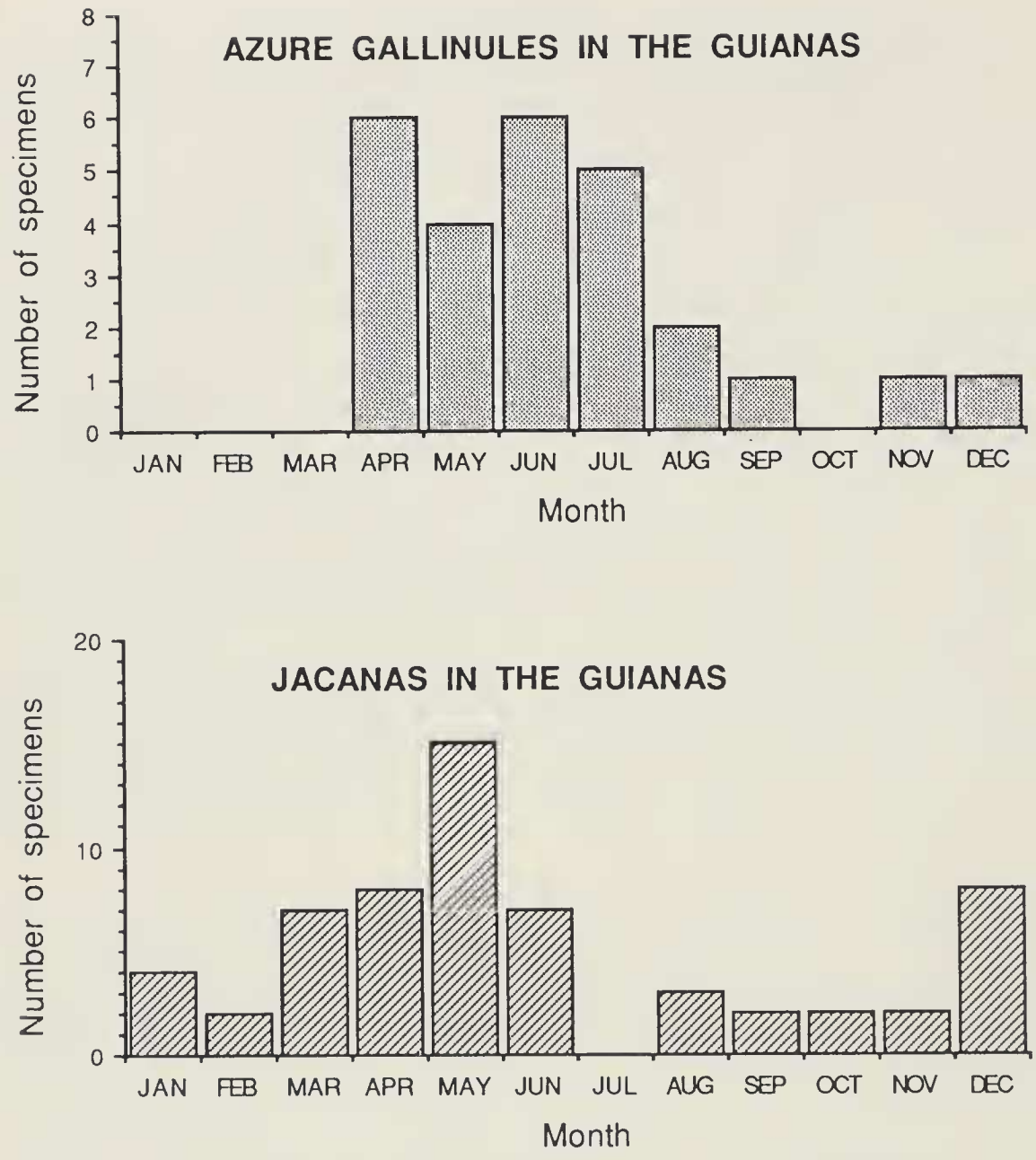

FIG. 1. Seasonal distribution of specimens of Azure Gallinule and Wattled Jacana in the Guianas.

Because most of these references relied in part on the same specimen data that form the backbone of our analysis, it is not surprising that our conclusions are generally similar. We suspect, however, that the Azure Gallinule is more widespread in Amazonia than specimen records indicate, because: (1) it is usually inconspicuous and its habitat is difficult to penetrate, and (2) immatures closely resemble immatures of the larger Purple Gallinule and therefore may be overlooked (Parker 1982).

Little has been published on the habitat of the Azure Gallinule. Haverschmidt (1968) stated that it is "common in freshwater swamps with deep

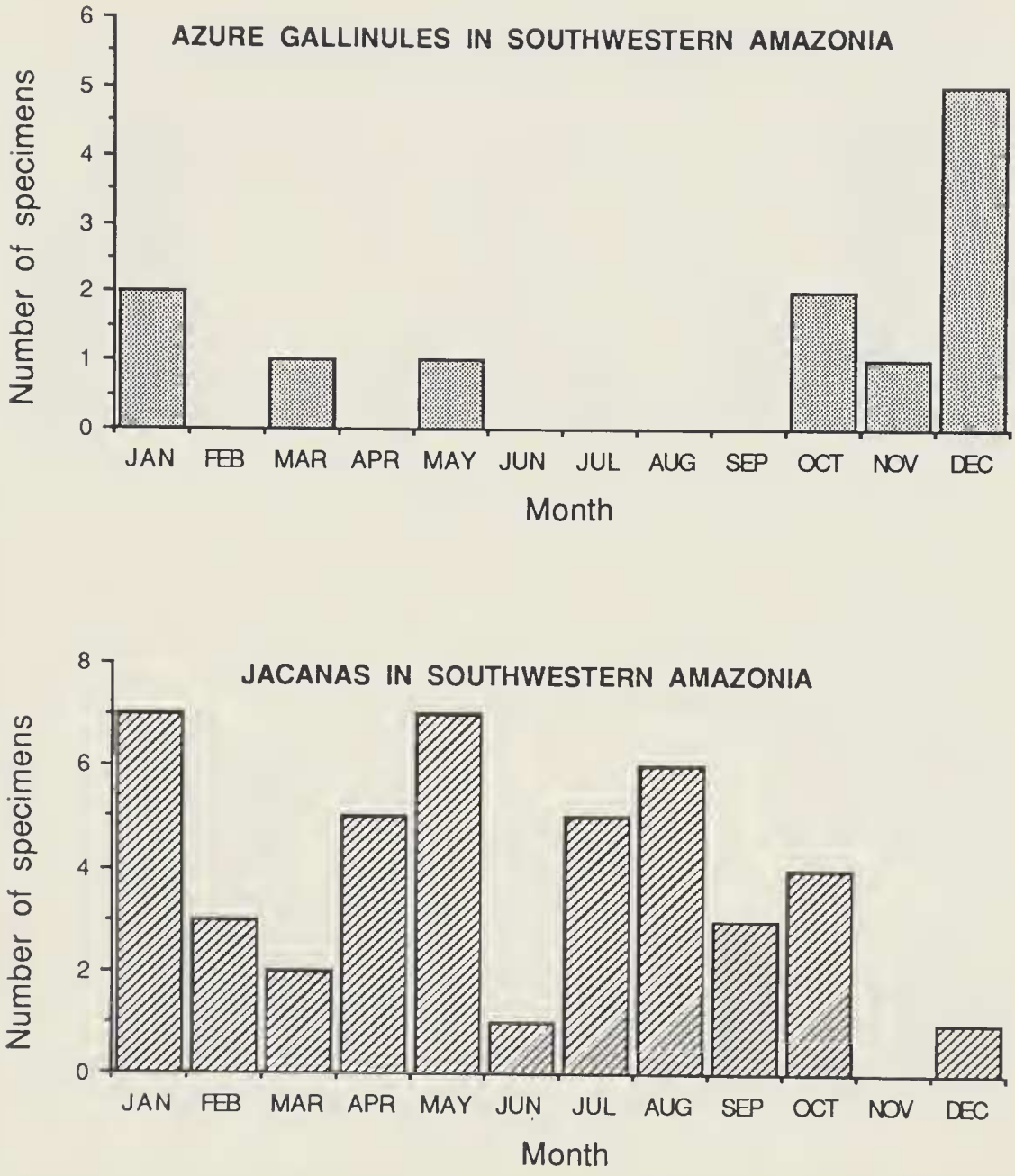

FIG. 2. Seasonal distribution of specimens of Azure Gallinule and Wattled Jacana in southwestern Amazonia.

water and a thick vegetation of grass, also in ricefields," and Hilty and Brown (1986) reported that it is "uncommon and local in freshwater marshes, ricefields, and marshy shores of ponds, lakes, and lagoons." In western Amazonia, we have found that the species inhabits floating mats of grasses and sedges along the edges of oxbow lakes (Parker 1982) and riverine marshes. Azure Gallinules are usually flushed from inundated grasses that rise 15–30 cm above water. They avoid (slightly drier?) areas with bushes and *Heliconia,* the preferred habitat of Purple Gallinules. When rivers are at or near flood stage, Azure Gallinules congregate in the

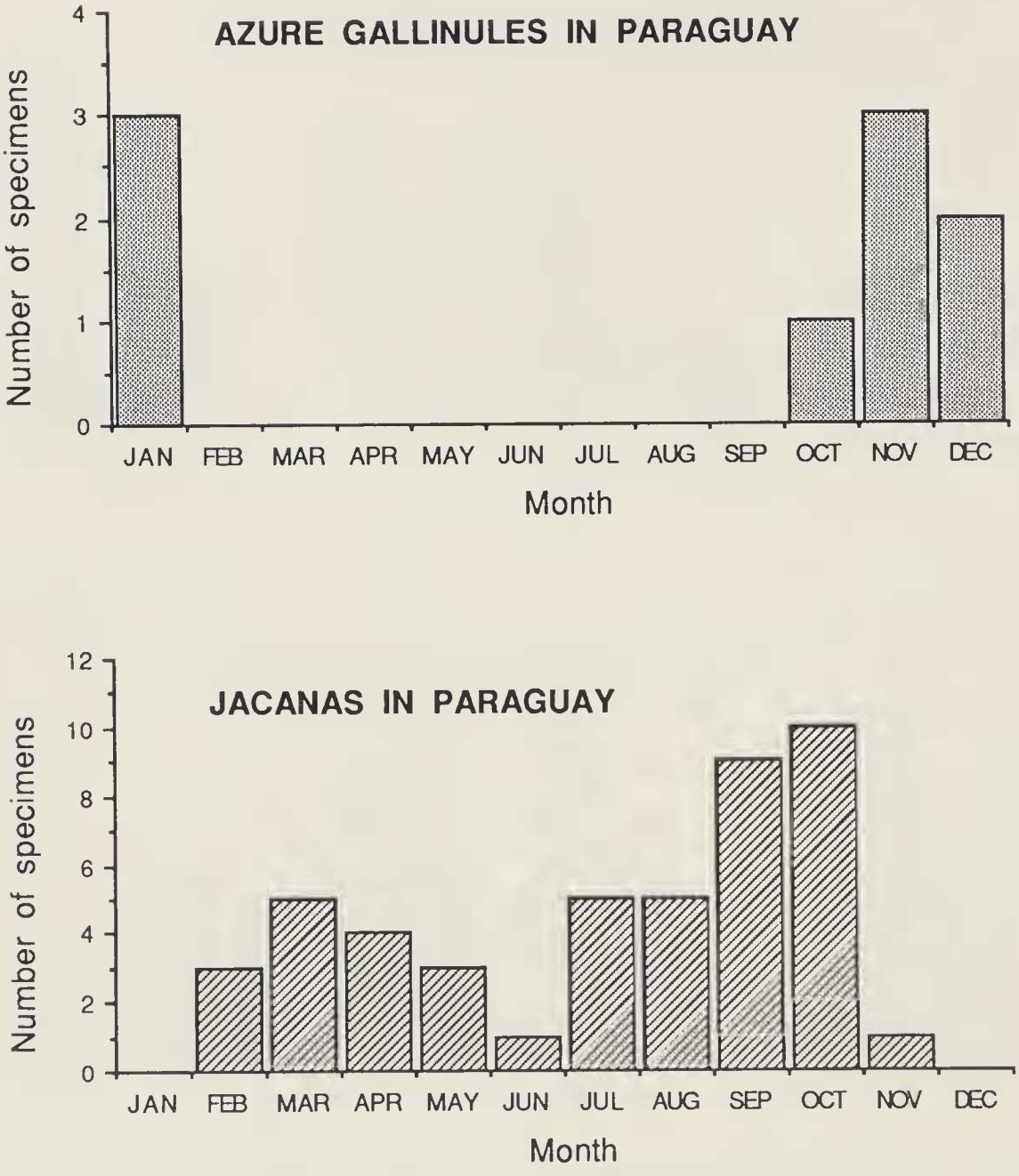

FIG. 3. Seasonal distribution of specimens of Azure Gallinule and Wattled Jacana in Paraguay.

grassy (*Paspalum*) marshes along the edges and lower ends of river islands; such areas occasionally cover up to 1 km^2, but are usually long and narrow. The birds usually stay hidden within *Paspalum* about 1 m tall, but when river-levels are near flood stage, Azure Gallinules occasionally perch near the tops of grass clumps. Under these conditions, "a minimum of 12 (and prob. 15–16)" Azure Gallinules were observed at Isla Corea and Quebrada Tucuchira near Leticia, Colombia, 20–23 February 1984 (S. L. Hilty and R. S. Ridgely), and six (all immatures) were flushed from ca 15 cm of

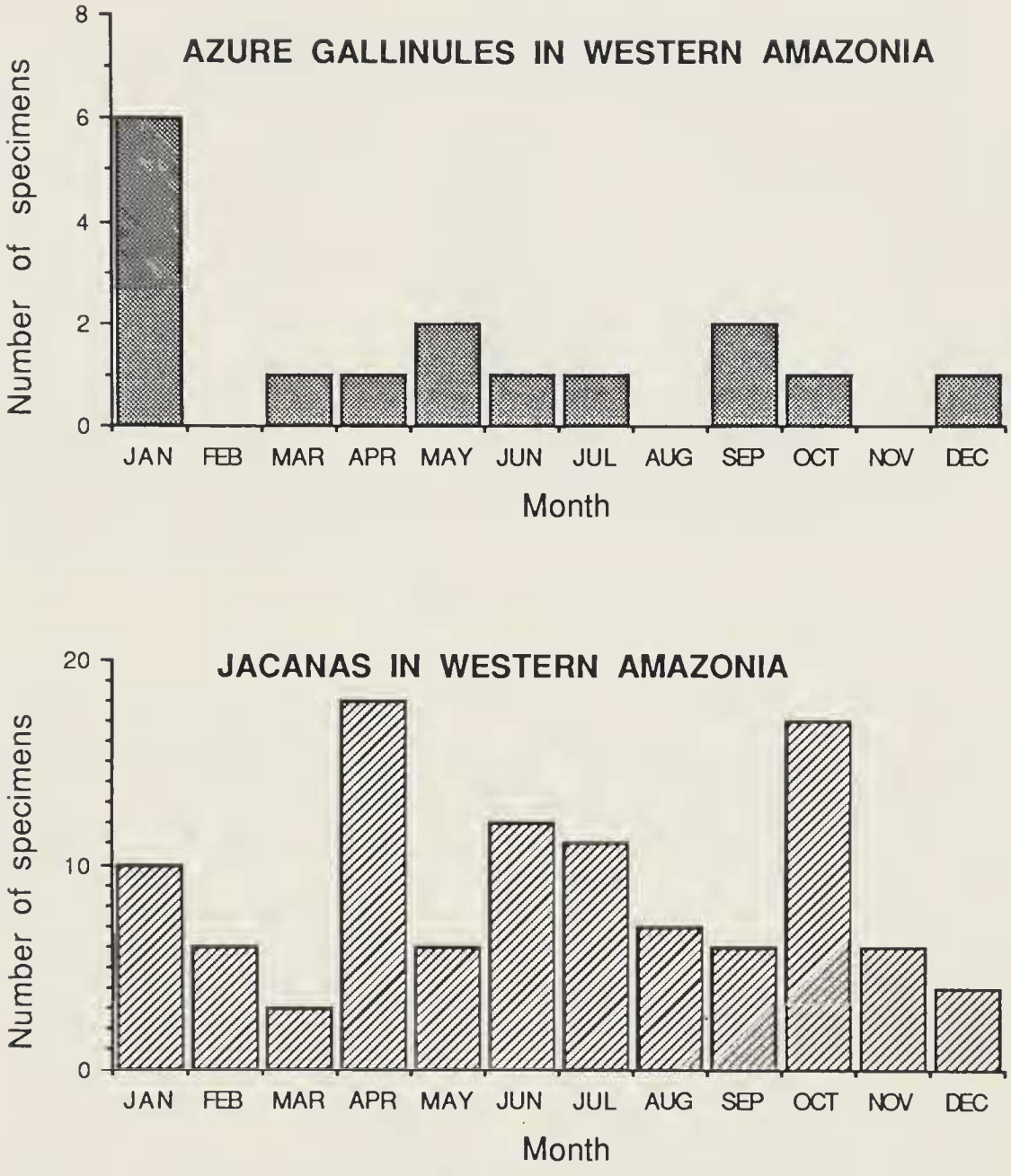

FIG. 4. Seasonal distribution of specimens of Azure Gallinule and Wattled Jacana in western Amazonia.

grass over 1 m of water along a river channel through Isla Timicurillo below Iquitos, Peru, on 27 January 1989 (Parker and T. S. Schulenberg). Six additional records of single, immature gallinules flushed from flooded *Paspalum* areas on river islands in the lower Rio Napo (Isla Llachapa, Isla Tamanco) range from January to July (Parker pers. obs.). At Quebrada Tucuchira and nearby Isla de Santa Sofía II, Remsen found 1–4 Azure Gallinules in extensive *Paspalum* mats on eight dates from 21 May to 24 June (1975), near the peak flood stage of the Amazon River. Until such

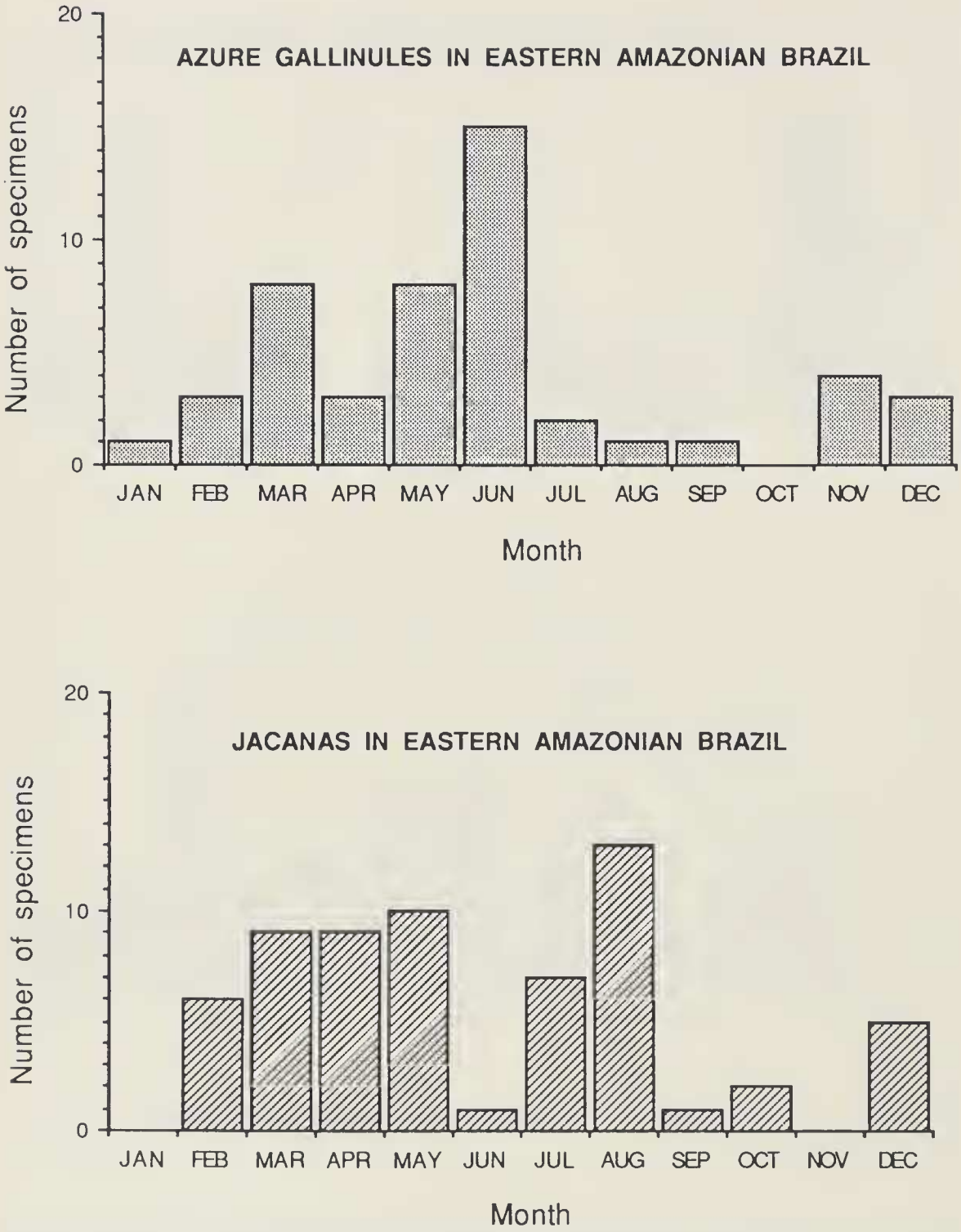

FIG. 5. Seasonal distribution of specimens of Azure Gallinule and Wattled Jacana in eastern Amazonian Brazil.

habitats are thoroughly surveyed, our knowledge of the true status of Azure Gallinule will remain incomplete.

The distribution of specimen records of the Azure Gallinule suggests that it is more common in forested regions than in the wet savanna regions

TABLE 1
NUMBER OF AZURE GALLINULE SPECIMENS FROM EACH COUNTRY

Country	Number of specimens
Bolivia	4
Brazil	84
Colombia	4
Ecuador	3
Guyana	9
Paraguay	9
Peru	1
Surinam	22
Venezuela	2
United States	1
Unknown	3

bordering Amazonia, in spite of the abundance of marsh habitat in these savannas. We found only one specimen record from the savannas (*llanos*) region of eastern Colombia and northern Venezuela, although Thomas's (1979) records from the Venezuelan *llanos* and McKay's (1980) records from the edge of the Colombian *llanos* suggest that the absence of specimen records is misleading. Likewise, there are few records from the wet savannas (*pantanal*) of eastern Bolivia and southwestern Brazil. However, we cannot tell how many of the specimens from the Guianas and eastern Amazonian Brazil were taken in the wet savannas within these generally forested regions.

Because we surveyed most of the world's collections containing Amazonian birds (see Acknowledgments), we think that we have located >75% of the extant specimens. Therefore, the low number of specimens (143) suggests that it is either not a common species, that it is difficult to collect, or (as we suspect) both. In contrast, there are more than twice as many specimens of Wattled Jacana in the American Museum of Natural History alone. Our own fieldwork confirms that the Azure Gallinule is definitely not a common bird in southeastern Colombia, eastern Peru, or northern Bolivia, areas from which relatively few specimens are known (Table 1). Specimen records suggest that the Azure Gallinule is most common in Surinam and eastern Amazonian Brazil, particularly in the state of Pará; however, Pará is an area worked intensively by collectors in Brazil, and thus the large number of specimens from there may reflect a regional bias in collecting efforts.

Seasonal distribution.—The Azure Gallinule is highly seasonal in occurrence in three regions. In the Guianas (Fig. 1), almost all records are from April to August, the wet season, with one immature from November and an adult from December. In contrast, most records from southwestern Amazonia (Fig. 2) are from October to January, except for one March (adult) and one May (immature) specimen and a few other sight records of immatures from June to August by Parker (1982). In Paraguay (Fig. 3), all records are also from October to January, the wet season there. In the two regions closest to the equator, western Amazonia (Fig. 4) and eastern Amazonian Brazil (Fig. 5), seasonality in distribution of specimen records is not so pronounced, but evident nonetheless. In eastern Amazonian Brazil, all but nine specimens (18%) were collected from February to August; of these nine, five were immatures. In western Amazonia, specimens are relatively evenly distributed throughout the year, except for a notable increase in January. Over all, the species is present seasonally in areas at the periphery of its range, but seasonality is less evident in the Amazonian regions closest to the equator. ffrench (1985) reported that there were a "considerable number" of sight records from Nariva Swamp, Trinidad, all since 1978, but did not indicate whether there was a seasonal pattern.

Along the upper Amazon River near Iquitos and Leticia, we have found that the presence of Azure Gallinules in *Paspalum* marshes coincides with the high river levels there from January to July. From late July to early December this habitat is usually one to several meters above water level. Remsen worked nearly daily in the vicinity of *Paspalum* marshes near Leticia for nine months in two field seasons spanning 18 May to 21 November, but Azure Gallinules were detected no later than 24 June. Where these individuals go from July to December is mysterious, especially because the distribution of specimens show little seasonality in the region as a whole (Fig. 4).

The monthly distribution of specimen records of Wattled Jacana in the Guianas (Fig. 1) shows a peak similar to that of Azure Gallinule in April–June, but otherwise is less seasonal. In southwestern Amazonia (Fig. 2), Wattled Jacanas have been collected year-round, with lows in November and December; this contrasts with the strongly seasonal pattern of Azure Gallinules in the same region (Fig. 2). In Paraguay, the jacana may be seasonal in occurrence (Fig. 3), but the period of scarcity there, November through January, corresponds to the period of presence of Azure Gallinule (Fig. 3). In western Amazonia (Fig. 4), the monthly distribution of jacana specimens is relatively even, as it is in the Azure Gallinule. In eastern Amazonian Brazil, the monthly distribution of the jacana is also similar

to that of Azure Gallinule (Fig. 5), with some seasonality (relatively scarce from September through January) evident in both species.

In summary, the monthly distribution patterns of specimen records of the largely sedentary Wattled Jacana support our interpretations of seasonality in distribution of the Azure Gallinule. In the Guianas, southwestern Amazonia, and Paraguay, where the Azure Gallinule is highly seasonal, the Wattled Jacana is not seasonal or shows a different pattern of seasonality. In the regions in which the presence of Azure Gallinule appears to be less seasonal or aseasonal, the Wattled Jacana shows a similar pattern.

Evidence for migration.—Although seasonal distribution of specimen records may provide circumstantial evidence for migration, more direct evidence will come from year-round surveys from single localities. Unfortunately, such surveys are nearly nonexistent within the range of the Azure Gallinule. Nevertheless, evidence from those few localities indicates that this species is present only seasonally. At the well-worked Tambopata Reserve in Dpto. Madre de Dios, Peru, Parker et al. (1982) found that small numbers appeared in early November and were present through at least January. At another site in Madre de Dios, Terborgh et al. (1984) considered Azure Gallinule to be a migrant (but in a different period, roughly March–October); however, there may be only one definite record from that site, an immature seen on 3 January 1982, and the species may actually be absent there from at least June to at least December (S. K. Robinson and D. Willard, unpubl. data). In western Dpto. Meta, Colombia, Azure Gallinules were present only from late May to mid-July in two successive years (W. McKay data in Hilty and Brown 1986). At a locality in the llanos of Venezuela, Thomas (1979) found this species present only from August to December.

Extralimital records and records in inappropriate habitat also provide circumstantial evidence for migration (or at least capability of long-distance movement). We are aware of five such records for the Azure Gallinule. An immature was collected at Escorial, at 3000 m in the Andes of Mérida, Venezuela, on 24 October 1903 (American Museum of Natural History). A specimen was found in a residential garden within the city of Bogotá, Colombia, ca 2600 m, on 9 December 1958 (Nicéforo and Olivares 1965, Olivares 1969) and another was obtained in the city of Bogotá on 2 December 1965 (Olivares 1969). John Coons and John Arvin (in litt.) saw an adult on 8 January 1989 in southern Venezuela sitting in a bush on "an otherwise unvegetated granite dome that formed part of an extensive escarpment that looked out over the canopy of miles of unbroken lowland forest" with "nothing remotely resembling gallinule habitat

for many miles in any direction." Arvin remarked that "the bird was much as one might occasionally find a migrant Purple Gallinule totally lost in some backyard or city park." This bird was found at 490 m elevation at about Km 110 on the highway that climbs up to the Gran Sabana, between El Dorado and Santa Elena on the Brazilian border. Finally, Parker saw an adult on 26 November 1986 in a flooded (short-grass) pasture near extensive *Typha* reedbeds, 1 km south of the Taim Ecological Station (32°30′S Lat., 52°35′W Long.), Rio Grande do Sul, Brazil, approximately 800 km SSE of the nearest previous record. We believe that these records represent wandering or migrating individuals.

Presence of large subcutaneous fat deposits would also provide strong evidence for migration. Unfortunately, most specimens of Azure Gallinule were collected decades ago (Fig. 6), before most study skins were accompanied by extensive data on fat, molt, and reproductive condition. In fact, so few specimens of Azure Gallinules were accompanied by data on subcutaneous fat that an analysis was not possible. A specimen labelled as being "fat" was taken in December in Guyana, and a specimen labelled as having "moderate fat" was taken in October in Ecuador.

We note that if only half the specimens of Azure Gallinule were accompanied by gonad, molt, and fat data, unravelling this species' annual cycle would have been relatively easy. Unfortunately, we suspect that this species is not unusual in having the vast majority of specimens collected before such data were included as standard label data.

Evidence of breeding.—Haverschmidt's (1968) summary of nesting information in Surinam covered three nests, all with eggs: 22 May, 15 June, and 9 August. These are the only published accounts of breeding that we have been able to find. Teixeira and Best (1981) reported that in Amapá, eastern Amazonian Brazil, the local residents claimed that the Azure Gallinule nested in May and June. There are apparently no egg sets in the world's museum collections (L. Kiff, in litt.); the egg set for Azure Gallinule in the Museum of Vertebrate Zoology listed by Kiff and Hough (1985) is an error (N. K. Johnson, in litt.).

Gonad data on labels of museum specimens can often be extremely useful for analyzing the timing of breeding of tropical species for which few nests have been discovered. Unfortunately, of the 96 specimens of adults, only 12 have label data on reproductive condition. Of these, only five have measurements of gonads; the rest have only abbreviations or codes, such as "ov. enl.," that are unfortunately subjective or ambiguous (Marra, in press). The seven birds in breeding condition are: (1) four from March, three from Pará and one from Amazonas, Brazil, and (2) three from Amazonian Ecuador, one in June (egg in oviduct), one in July, and

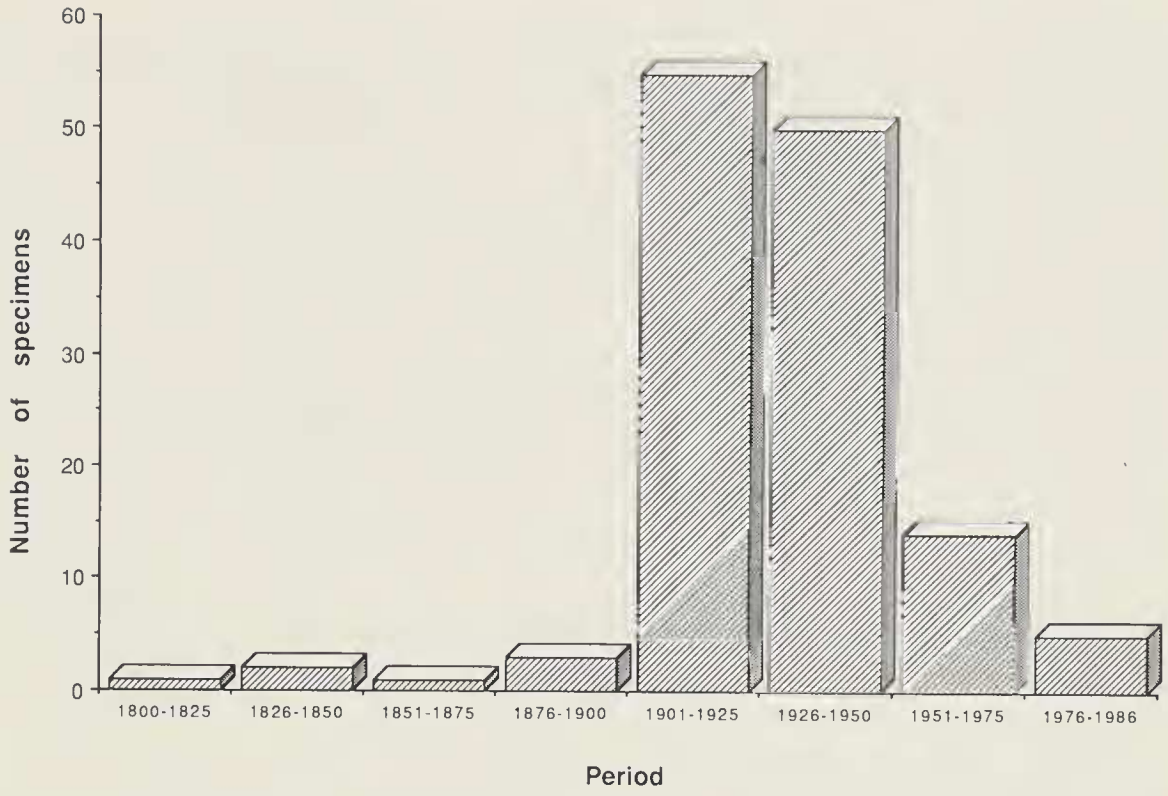

FIG. 6. Chronological distribution of Azure Gallinule specimens.

one in October (the latter a male with testes 11 × 6 mm, but with heavy general body molt and moderate fat, suggesting that it may not have been actively breeding). The five not in breeding condition are two from September from Amazonas, Brazil, one from November from Beni, Bolivia, and two from December from Pará.

Although generalization from such a small sample is obviously risky, the nearly complementary monthly distribution of reproductive and nonreproductive individuals suggest that the breeding season extends from March to August, and possibly as late as October, and that the nonbreeding season extends from September through December. These same data indicate that the Azure Gallinule breeds in the two areas where present year-round (western Amazonia and eastern Amazonian Brazil) and in one area where present only seasonally (Guianas).

The three breeding records from Surinam fall within the wettest period of the year, April–August (Haverschmidt 1968, p. xvi). Azure Gallinules in reproductive condition were taken in upper and lower Amazonian localities in March, June, July, and October; such seasonality may correspond to high river and lake levels rather than to local rainfall patterns. There is little seasonality in rainfall along the upper Amazon.

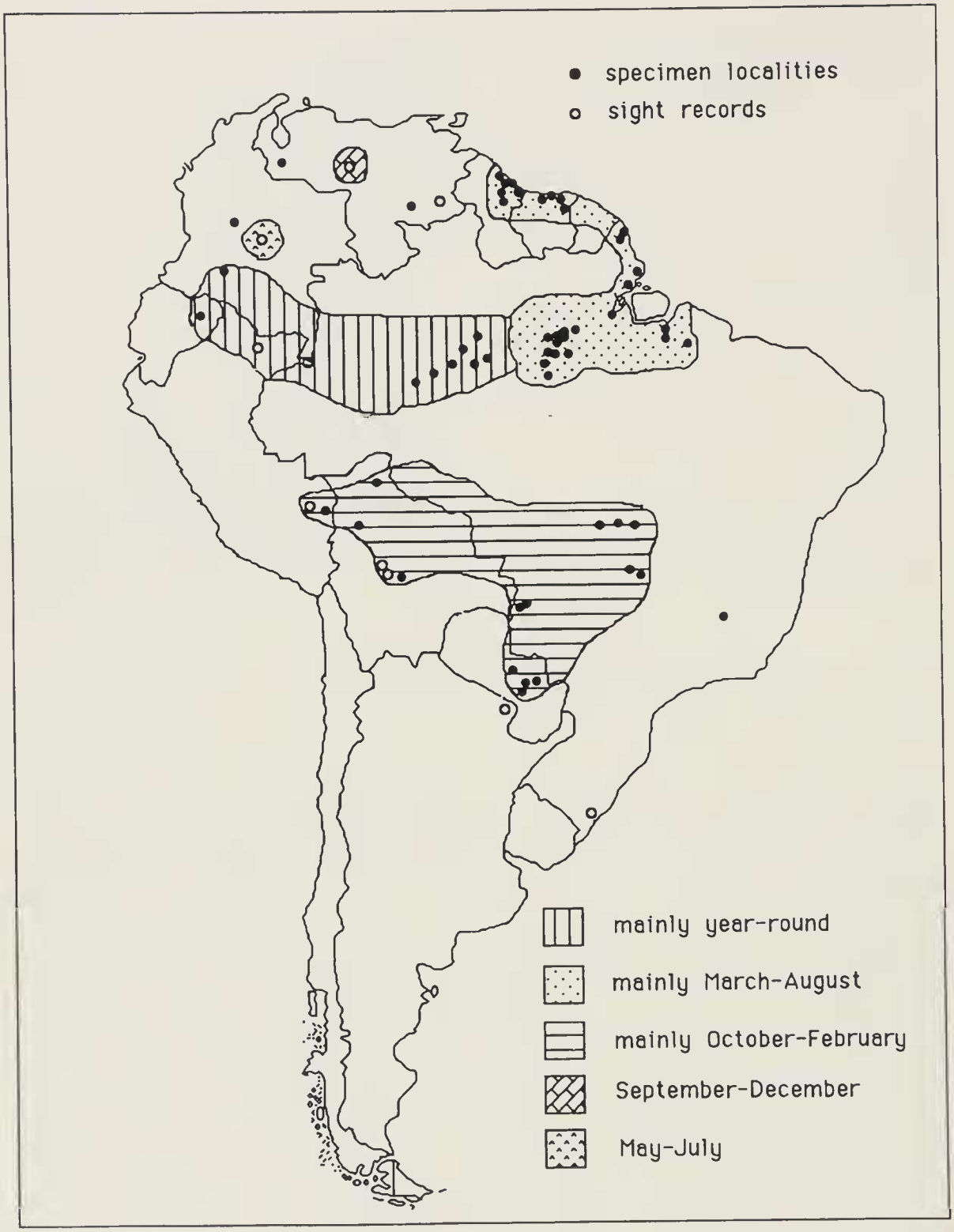

FIG. 7. Synthesis of seasonal distribution of Azure Gallinule in South America. Shaded areas indicate areas of regular occurrence. Isolated localities represent those considered to be extralimital (N = 4; see text) or difficult to assign to a region: (1) a specimen record for Chanaro River, (Bolivar?), Venezuela, is undated and cannot be included comfortably within any shaded region; (2) two specimens from Lagoa Santa, Minas Gerais, Brazil (4 April 1866, 9 Sept. 1839), may belong within the southwestern Amazonia-Paraguay cluster of localities; and (3) a sight record from Formosa, Argentina, probably also belongs within the Paraguay

Age and sex distribution.—Of the 126 sexed specimens, 74 (59%) are males. Within regions, sex ratios do not differ significantly from the overall sex ratio. In southwestern Amazonia, females outnumber males 7:5, but this sex ratio is not significantly different from that of the other individuals in the other regions combined ($\chi^2 = 0.13$, $P > 0.70$).

Of 113 specimens aged by plumage characters (blue-necked = adults, buff-necked = immatures), 96 (85%) were adults. Specimens in immature plumage (with dates) have been taken in May (N = 2), June (6), Sept. (1), Oct. (1), Nov. (3), and Dec. (2). Ten of the 16 immatures were collected in eastern Amazonian Brazil. Although specimens of immatures are too few to provide insights into their seasonal or geographical distribution, they form a disproportionately large proportion of the odd seasonal records within the various regions (see Seasonal Distribution). Although the vast majority of specimens are adults, most of our sight records are of immatures; we have no explanation for this difference.

DISCUSSION

We interpret the pattern of seasonal distribution of records to indicate that the Azure Gallinule is migratory, at least in part of its range. With the complimentarity in seasonal distribution between northeastern South America (the Guianas, and to some extent eastern Amazonian Brazil) and the southern periphery of Amazonia (southwestern Amazonia and Paraguay), we hypothesize that most of the population in northern South America disperses southward (after breeding May–July) to the southern periphery of Amazonia, where the nonbreeding season (the austral summer and wet season) is spent, and then the population returns to northeastern South America in February and March (Fig. 7). Such a migration route is approximately 1800 km long. This interpretation clearly must be viewed with caution because: (1) the number of breeding records is small, (2) year-round surveys from critical localities are nearly nonexistent, and (3) in general, marsh habitats in Amazonian South America are visited infrequently by ornithologists.

The specimen from New York was obtained on 14 December. From our hypothesis outlined above, this corresponds to the season when most

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cluster of localities. We were unable to locate any specimens from French Guiana other than two specimens labelled only "Caycnne." Thc reason that there are far fewer specimen localities plotted than there are specimens are that (1) in several cases, numerous specimens have been taken from the same locality, and (2) a number of localities in Brazil could not be located. Sight records from Trinidad (ffrench 1985) were not plotted because dates were given for only one record (July).

of the population has left northern South America for the southern periphery of Amazonia. The most likely date, therefore, for a vagrant would be during the periods August–December or January–February. In fact, the five other records that clearly represent vagrant individuals are from this period: the specimen from the high Andes of Venezuela was from late October, the sight record from Rio Grande do Sul was from November, the two specimens from the Andes of Colombia were from December, and the sight record from the Gran Sabana was from January. Therefore, the December record for New York falls within the period during which vagrants have been detected and during the presumed nonbreeding season. Of unknown relevance is the observation that the North American records of other tropical rallids (Paint-billed Crake [*Neocrex erythrops*] and Spotted Rail [*Pardirallus maculatus*]; Arnold 1978, Parkes et al. 1978, Blem 1980) were from November, December, and February, thereby bracketing the Azure Gallinule record. If the Azure Gallinule specimen from New York were an immature instead of an adult, then the case for the New York record representing a wild bird might also be considered stronger; however, at least two of the five records of vagrant Azure Gallinules have been of adults. The New York specimen did not have large subcutaneous fat deposits and was not emaciated.

We think that the New York record should be regarded as a natural vagrant, for the following reasons. First, the evidence favors treatment of the Azure Gallinule as a migratory species, at least in part of its range, and, as we will develop below, migratory rallids can be expected to appear at unpredictable places and seasons. Second, the dates of the extralimital records of Azure Gallinule show that vagrants can be expected from October to January, thereby bracketing the December date for the New York specimen. Third, the specimen apparently showed no signs of having been in captivity, and Azure Gallinule is virtually unknown in captivity. In our opinion, therefore, the New York specimen should be regarded as a valid record of a wild bird until proven otherwise. We also think that other North American records of tropical rails (Spotted Rail; Parkes et al. 1978; and Paint-billed Crake; Arnold 1978, Blem 1980) should also be regarded as representing natural vagrants. Although, in contrast to Azure Gallinule, there is no evidence that these two species are migratory, neither is there any evidence for the individual specimens having been in captivity (e.g., abnormal wearing of plumage, feet, or bill), or of those species ever being kept in captivity. We think that the statements by the AOU (1983) in reference to these records that "some of these individuals may have been transported by man" and "the North American vagrants may have been man-assisted" are overly conservative and ignore the propensity of rails to occur as vagrants at unexpected times and places.

In North America, for example, migratory rallids have produced the following extralimital records (from AOU 1983): Corn Crake (*Crex crex*) in seven states, two Canadian provinces, and Bermuda; Spotted Crake (*Porzana porzana*) in the Lesser Antilles; Black Rail (*Laterallus jamaicensis*) in Bermuda; King Rail (*Rallus elegans*) in Newfoundland; Virginia Rail (*R. limicola*) in Bermuda and Greenland; and Common Moorhen (*Gallinula chloropus*) in Newfoundland, Greenland, Iceland, and the Commander Islands. Among species generally considered sedentary, the following records are of interest: (1) Paint-billed Crake in Texas (*N. e. erythrops* of the Galapagos and western Peru; Arnold 1978), Virginia (probably *N. e. olivascens* of eastern South America; Blem 1980), at ca 2600 m in the streets of Bogotá, Colombia (Olivares 1969), and at 3375 m in a garden in a suburb of La Paz, Bolivia (Remsen and Traylor 1983); Spotted Rail in Pennsylvania (as well as the Juan Fernandez Islands, 650 km from the Chilean mainland and at least 1500 km from the nearest potential breeding population; Parkes et al. 1978); and Clapper Rail (*R. longirostris* in Newfoundland, Vermont, Nebraska, western Pennsylvania, and West Virginia; AOU 1983, Mulvihill and Leberman 1989).

As noted by Parkes et al. (1978), perhaps the champion vagrant among the rails and gallinules is a species in the same genus as the Azure Gallinule, the Purple Gallinule. The AOU (1983) listed records of Purple Gallinules from the following extralimital localities: South Africa (at least 20 records; Urban et al. 1986), the Azores, Britain, continental Europe, Falkland Islands, Tristan da Cunha Is. (ca 3800 km from South American mainland), Ascension Is. (ca 2500 km east of South American mainland), the Galapagos Islands, St. Helena Is. (ca 6400 km from the South American mainland), and in North America, as far west as California and as far northeast as Labrador. The third species in the genus *Porphyrula,* Allen's Gallinule (*P. alleni*) of sub-Saharan Africa, has been recorded in Europe, North Africa, and on offshore islands as follows (from Cramp et al. 1980, Urban et al. 1986): Britain (N = 1), France (2), Spain (2), Denmark (1), W. Germany (1), Italy (5), Cyprus (1), Egypt (1), Tunisia (1), Morocco (4), the Azores (4), Ascension Is., St. Helena Is., Comoro Is., and Rodriguez Is. (In fact, we wonder whether Allen's Gallinule was eliminated from consideration in all extralimital sight records of the superficially similar Purple Gallinule; it seems inevitable that Allen's Gallinule will eventually be recorded in the New World.) Furthermore, Allen's Gallinule is known to be an intratropical migrant in Africa, with migrations in response to wet and dry seasons; it arrives in an area at the onset of the wet season, breeds, and then leaves during the dry season (Urban et al. 1986). We suspect that Azure Gallinule performs similar intratropical migrations in response to wet and dry seasons in South America.

Because most rails are secretive or prefer concealing habitats, they are more difficult to detect than most kinds of birds. Therefore, we feel that knowledge of seasonal movements and patterns of vagrancy in rails is at a primitive stage relative to that for other bird groups. We speculate that the number of vagrant records of these birds would increase dramatically if ornithologists were able to sample more effectively the emergent vegetation and tall wet grass that is the preferred habitat for most rails. It is, therefore, not surprising to us that many extralimital records of rallids were obtained from TV and other towers, mammal traps, cats, and by other methods that do not include the usual activities of ornithologists or birders.

A global overview of rail and gallinule distribution patterns also provides evidence for the dispersal capabilities of these birds. Rails and gallinules in general are among the best long-distance island-colonizers among nonmarine birds (Ripley 1977:15–20). Many remote, oceanic islands have been colonized by one or more species of rails. From the species accounts in Ripley (1977), we counted at least 15 species of rails and gallinules endemic to oceanic islands, and at least 10 other species that have from one to eight subspecies restricted to an oceanic island. Even these impressive tallies are almost certainly drastic underestimates of true rail diversity on islands. As Olson (1973, 1989), Olson and James (1982), and others have shown, many species of rails endemic to islands have disappeared recently (presumably exterminated by the arrival of humans and their commensal mammals) and are known only as neofossils. For example, Olson and James (1982) listed eight species of rails, all extinct, from recent fossils in the Hawaiian Islands. Further evidence for the dispersal capabilities of certain rallids comes from the amazingly widespread distribution of some species. For example, the Common Moorhen is found nearly world-wide, including on such remote oceanic archipelagos as Hawaii, the Galapagos, and the Marianas. That the Rallidae are excellent transoceanic dispersers is also suggested by the unusual distribution patterns of rallid genera—many have nearly world-wide distributions or at least pantropical distributions, in glaring contrast to the pattern shown by most nonmarine, nonboreally distributed birds. For example, *Porzana* (including the Sora of North America) is found in Africa, Madagascar, Asia, Australasia, New Zealand, most Pacific Islands (including Hawaii), North America, the West Indies, South America, and Asia. Finally, even within a species, several dramatically disjunct distributions suggest long-distance colonizing ability (although vicariance could also potentially explain such a pattern). For example, there is a population of the Yellow Rail in the highlands of Mexico and populations of the Black Rail and the Virginia Rail in western South America (Ripley 1977).

In summary, because rails and gallinules account for some spectacular instances of vagrancy, with some records thousands of kilometers from their known breeding range, and because their global distribution pattern indicates that they are champion dispersers and colonizers, we think that extralimital records of these birds should be regarded in general as representing wild vagrants unless there is some specific reason to think otherwise.

Why are some rails and gallinules such good dispersers? The essentially ephemeral nature of the marsh and wet grassland habitats of many species dictates that they must be good dispersers. Populations not capable of evacuating marshes that dry up in order to find new marshes are doomed to extinction. Most freshwater marshes proceed through various successional stages, the last of which is dry land. So, marsh birds have to be good dispersers, even if not migratory. Because their dispersal may be dictated by droughts, floods, and short-term successional stages, we also predict that their pattern of seasonal occurrence would be somewhat erratic (other than migration periods for those that are long-distance migrants). Therefore, we predict, a priori, that species thought to be sedentary may appear at unpredictable times and places. Also, the "weak" flight of many rails and gallinules may make them particularly vulnerable to being blown off-course by storms.

Although several taxa of rallids are excellent dispersers, many taxa, as pointed out to us by S. L. Olson (in litt.), are not. Numerous species and genera are confined to restricted regions of the tropics, with no history of dispersal or vagrancy. As a corollary of our arguments above, we predict that those species least likely to occur as vagrants are those restricted to forests and other habitats that show much less seasonal or annual variation in their suitability than marshes.

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